Psychological

Monographs

General and Applied

Psychosocial Study of the Patient with Pulmonary Tuberculosis:
A Cooperative Research Approach
By

Claire M. Vernier
Veterans Administration Central Office, Washington, D. C.
Robert P. Barrell
Veterans Administration Hospital, Downey, Illinois
Jonathan W. Cummings
Veterans Administration Hospital, Fargo, North Dakota
Joseph H. Dickerson
Veterans Administration Hospital, Minneapolis, Minnesota
H. Elston Hooper
Veterans Administration Hospital, Augusta, Georgia

Price $1.50

Psychological Monographs:

General and Applied

PSYCHOSOCIAL STUDY OF THE PATIENT
WITH PULMONARY TUBERCULOSIS:
A COOPERATIVE RESEARCH APPROACH [1]

CLAIRE M. VERNIER
Veterans Administration Central Office, Washington, D. C.

ROBERT P. BARRELL
Veterans Administration Hospital, Downey, Illinois

JONATHAN W. CUMMINGS
Veterans Administration Hospital, Fargo, North Dakota

JOSEPH H. DICKERSON
Veterans Administration Hospital, Minneapolis, Minnesota

AND H. ELSTON HOOPER
Veterans Administration Hospital, Augusta, Georgia

STUDY of the psychology of the patient with pulmonary tuberculosis has been of increasing interest to psychologists in recent years. The disease and its treatment have many facets which are sources for the production of anxiety in the patient. For centuries tuberculosis was considered almost incurable. Mildly effective attempts at treatment began in the last century. Only in the last decade has really effective treatment been discovered and put into widespread use. In spite of this progress and general enlightenment, tuberculosis remains a disease to be highly dreaded and the public retains the image of the tuberculosis patient as someone to be avoided as a health threat.

Hospitalization for the treatment of tuberculosis creates many problems for the patient. Because it is a contagious disease, the patient must be isolated. For the patient, hospitalization results in his being uprooted from his usual environment for months on

end, often leaving the family without adequate income, and depriving the patient and his family of mutual emotional support. The hospital requires a certain amount of regimentation for smooth and efficient operation, yet this tends to force a dependent role on the patient. Sanitary precautions needed to prevent spread of the disease are restrictive and unnatural to the patient and his family.

The treatment process itself is also very frustrating. Progress is very slow. It is measured in months rather than in hours, days, or weeks as with other illnesses. The patient feels fine, practically from the start of treatment, yet must accept the fact that he is ill and needs to be kept isolated. The threat of possible lung surgery is constantly there. Surgery is considered a critical operation, the need for which is often only partially understood and the possible results frequently considered not worth the risk involved. The patient can hardly help but wonder as he talks to some of the "old chronic" patients on the ward whether he will really get well and stay well. The future which must be so far postponed may look far from promising as he is concerned with worries about holding his place at work, and about what relationships in the family and neighborhood will be like after he returns home.

It is because of these "psychological" aspects of pulmonary tuberculosis that psychologists have been assigned to wards where these patients are treated. Out of a common interest in these problems, a group of such psychologists in Veterans Administration hospitals met in 1956 to formulate a coordinated research program designed to study the psychological aspects of the illness and its treatment. Subsequently the large scale cooperative study, which is the subject of this report, was developed.

Because of its nationwide program of medical care, the Veterans Administration has been able to contribute significantly to the field of medical research through the medium of cooperative research programs. These have included projects involving several disciplines with simultaneous data collection in many of the 170 hospitals and other medical facilities. Through the machinery of central laboratories the data collected can be quickly analyzed and a large number of variables and subjects included in the various studies. Added to this is the potential advantage of having differences between institutions and other chance factors tend to cancel each other out, thus providing findings more representative of the total group of patients for whom the results may be applied.

Tuberculosis, in particular, has lent itself readily to cooperative research. Large scale investigations have been carried out by the Veterans Administration and the Armed Forces (Transactions, 1959), the United States Public Health Service and the British Medical Council. Among these have been many studies reporting the effectiveness of various combinations of drugs (Quarterly Progress Report, 1958).

These investigations have led to many advances in the treatment of a disease which is known to be chronic and subject to exacerbation and remission during its natural untreated course. Recent years have brought increasing awareness of the stressful factors of the imminence of contagion, the necessity of long-term institutionalization, and the threat of some residual degree of permanent disability. With such a background the application of cooperative procedures to the study of the psychosocial factors in the treatment of tuberculosis was a natural development.

Summary of the Literature

Almost 100 years ago an article was published by Clouston (1863) in which he maintained that there was a relationship between tuberculosis and emotional disturbance. During the next 80 years many hundreds of reports appeared, all imputing some personality characteristic or other to tuberculosis patients.

Although these reports served as a rich source of hypotheses, they did not materially advance our knowledge. All too often observations were made on a small number of cases; contradictory conclusions were extremely common; subjective rather than

objective evaluations were the predominant procedure; and research designs adequately testing the various hypotheses were unheard of.[2]

During the past 20 to 25 years a number of experimental studies have appeared, testing a variety of hypotheses and advancing our knowledge in several ways. We no longer think of there being a "tuberculosis personality," thanks to the work of Derner (1953) and others. Differences between scores on psychological tests of tuberculosis patients and non-ill people do occur (Andreychuk, 1954; Hand, 1952; Muldoon, 1957; Page, 1947), but these are seen in the context of the patients' experience of hospitalization. A number of studies report work on specific emotional characteristics such as depression (Derner, 1953) and anxiety (Derner, 1953; McElroy, 1950), and enable us to conclude that these frequently are found in tuberculosis patients. Some relationship between psychological factors and response to treatment is strongly suggested by the work of Brotman (1955).

Certain behaviors can be predicted in tuberculosis patients. Discharge against medical advice can be predicted from demographic data (Moran, Fairweather, Morton, & McGaughran, 1955) and from projective techniques (Calden, Thurston, Lewis, & Lorenz, 1956; Vernier, Whiting, & Melser, 1955). Behaviors within the hospital can be predicted from a sentence completion test specifically designed for tuberculosis patients (Calden, 1953; Thurston, Lorenz, & Calden, Z0T–C–68) and from questionnaires (Moran et al., 1955; Pauleen, 1955).

Little experimental work on posthospital behavior has been done, other than evaluation of rehabilitation training programs (Agur & Anderson, 1954; Armstrong, 1953; Longton, Wagner, & Meier, 1950; Marion & Salkin, 1959; Warren, 1954) or of physiological recovery (Alling, Bosworth, & Lincoln, 1955; Guest, 1943).

Throughout the experimental literature, however, behavior is considered as synonymous with segmental aspects of personality (as anxiety, depression, or psychotic-like reactions) or as synonymous with specific actions (as leaving the hospital or as working after discharge). None of the research attempts to evaluate the patient's behavior as a total response to a complex environmental situation. And no study can be found which provides: an integration of medical, social, psychological and behavioral data, as contributed by representatives of several professional disciplines; and a longitudinal approach covering both hospital and postdischarge adjustment.

The Cooperative Psychological Research Projects

Rationale. The projects that are described in this report were based on the underlying premise that a person's psychological makeup largely determines the manner in which he will adjust to the complex changes in his life pattern which are demanded by hospitalization for treatment of a somatic illness such as pulmonary tuberculosis. These environmental changes may be classified into those related to his hospitalization, his medical treatment, and his return to the community after release from the hospital. The patient's adjustment in these three areas is viewed as being influenced in part by psychological factors. The present research was designed to study the nature and degree of the relationships between psychological factors and behavior in each of the three areas. Accordingly, three studies were designed. The first seeks to determine the relationship between psychological factors and the way the patient adjusts to his hospital environment. The second investigates how his psychological makeup relates to the kind of response he makes to the medical treatment. The third studies psychological factors as they relate to the patient's adjustment following his return to the community.

Research Design. All three of the studies provided for the use of the same basic testing procedures. All patients were given a

4   VERNIER, BARRELL, CUMMINGS, DICKERSON, and HOOPER

battery of psychological tests and the investigator obtained the same personal history and social data in all three studies. The primary differences between the studies are found in the measuring devices used to assess the criterion with which each was concerned, i.e., hospital adjustment, response to medical treatment, and posthospital adjustment.

Two forms were used to collect the basic demographic and factual data for each subject. An identifying data sheet was used to record information usually found in hospital records, such as his age, diagnosis, military service, etc. A personal information sheet provided additional data available only from the subject such as facts about his education and family background. The subject completed this form at the same time as he took the psychological tests.

Several criteria were used in the selection of a suitable psychological test battery for these studies. Total testing time should be relatively short so that the test battery could be completed in one session and not overtax the patients. Optimal time was felt to be about one hour. It was also determined that tests to be selected should be easy to administer, capable of objective scoring, appropriate to a wide range of educational level, and nonthreatening to the subjects. In addition the battery should attempt to sample a wide range of psychological variables. With some reluctance it was determined that many of the tests customarily used by the psychologist did not meet these criteria. By applying the selection standards the following battery was chosen:

1. Personnel Test for Industry, Form A —a 5-minute wide-range intelligence test composed of 50 multiple-choice items

2. IPAT 16 Personality Factor Test, Form C—an objective personality test developed by factor analysis (Cattell, 1956)

3. Madison Sentence Completion Test, Short Form—20 incomplete sentences devised specifically for tuberculosis patients

4. House-Tree-Person Test—a projective test in which the subject is asked to draw on separate pages a house, a tree, and a person (Buck, 1948)

Two of the four tests, the Personnel Test for Industry and the 16 Personality Factor Test, are objective tests with standardized scoring systems. The Sentence Completion Test and the House-Tree-Person are projective tests and required the development of scoring systems in order to objectify the results for use in the statistical analysis of the results. Following a survey of the literature a number of variables which could be judged at a fairly objective level were selected, i.e., in the person drawing, the presence or absence of a belt. The projective tests of an initial sample of 500 subjects were scored using these variables. Adequate scoring variables for the "tree" and "house" were not available in the literature and these were omitted from the study.

All of the test scores were intercorrelated for this sample and by inspection groups of scores which were significantly related to each other were selected. From these groupings variables which seemed to make psychological sense were chosen for later comparison with the criteria for each study. This process might be described as one of "rational factor analysis." Each of the seven groups of items shown in Table A1 is used as a single personality scale in the analysis of the results.

In order to further facilitate analysis of the data it was decided that as far as possible the criterion measures to which the above psychological tests and the demographic variables would be compared should be simplified by the development of single quantitative measures of the criteria. In order to fulfill this requirement, indices of hospital adjustment, response to treatment, and readjustment to the community were developed. Detailed description of these measures will be presented in the sections devoted to the specific studies which make up the project.

An Over-All View of the Project

The protocols and research materials for each of the three studies were distributed to 18 Veterans Administration hospitals in

September 1957. Data collection was completed by March 1958 and all materials were forwarded to the Central Research Laboratory at the Veterans Administration Hospital, Baltimore, Maryland.

The number of patients available for analysis of results varies according to each study. This results from the fact that participation by each hospital was voluntary and some chose to participate in all three studies and some in only one or two of the three. The total number of patients tested in all phases of the project was 814. Forty-seven of this number were females and are not included in this report. The number of subjects used for each of the individual studies will be presented in the subsequent sections.

It may be of interest to note that for the total sample of 767 male veterans, the average age was 43.1 years. Seventy-six percent were Caucasian, 22% Negro, and 2% from other ethnic groups. Thirty percent were single, 48% married, 4% widowed, and 18% separated or divorced. The average years of education for the total group was 9.9.

Each of the sections presents the report of one study area, hospital adjustment, response to treatment, and posthospital adjustment. Each will describe the rationale, design, and development of criterion measures which are unique to the specific study. The results obtained from comparison of the psychological and demographic variables to the criteria will then be presented and discussed. The final section will integrate the findings of all three studies, consider their implications, and outline further developments planned in this research program.

Hospital Adjustment

Study of adjustment of tuberculosis patients to their hospital experience was thought relevant to the present cooperative project for a number of reasons, which were presented previously. Because of the complex nature of the adjustment process, many facets must be considered in a study of hospital adjustment. Theoretically, at least, consideration of the entire gamut of psycho-

logical and social factors involved would be desirable. This would include the basic psychological equipment which the patient brings with him to the hospital situation, the specific characteristics of the ward and of the hospital which the individual experiences as a patient, and the extrahospital environmental factors which are of importance to the patient. This intensive approach was not possible in the present study. Instead, broad classifications of interpersonal and situational factors were made and serve as orienting points around which the processes involved in adjusting to the hospital situation could be ordered.

This section will consider the hospital adjustment area of the project and will include a description of the measurement devices used, the statistical method employed, and the attempts to develop an index which would facilitate comparison of hospital adjustment with other areas of the total study. How well the psychosocial variables predict this index and the characteristics of "good" and "poor" hospital adjusters will also be presented.

Measurement

The Measuring Device. "Hospital adjustment," for purposes of this study, refers to complex sets of behaviors which are determined by several factors. These factors do not lie solely in the need structure which the individual brings to the institutional setting; the atmosphere of the hospital and the reactions toward the patient on the part of the hospital personnel can exert a large influence on the behavior from which the character of his hospital adjustment will be ultimately judged.

In measuring hospital adjustment, then, views of personnel toward the patient may be as important data as are the attitudes of the patient. Thus four multiple-choice rating scales were developed [3] to be completed by the patient, his physician, and the nurse and the aide who knew him best, respectively. The physician's form contained 8 items; those for the nurse and the aide contained 11 each;

the patient's form contained 22 multiple-choice items and was supplemented by 5 sentence completion items designed to give the patient some latitude in describing his feelings toward tuberculosis. All four forms included a space at the end in which the rater could make additional remarks.[4]

Criteria for selection of items and areas to be covered were that: (a) they reflect, in the investigators' judgment, a significant aspect of the hospital situation; (b) the information asked be pertinent for the experience of the rater; (c) they relate to areas of hospital routine and interpersonal interaction; (d) the task of completing the ratings would take a minimum of personnel time.

It will be noted that the four scales are not exactly the same. Although their being homologous might have simplified statistical operation, there is reason to doubt that all personnel were equally capable of judging, for example, the patient's sleeping and eating habits or his relationships with other patients and with personnel. Thus, each rater was asked to make only those judgments about the patient which his particular interaction with the patient qualified him to make.

Some Statistical Considerations. Ratings described above were completed on 500 male patients. Frequency tabulations of the response choices for each item were compiled, cutoff points which dichotomized the response distributions were chosen, and tetrachoric correlations were computed among all items from the four scales. A summary of results showing the percentage of significant interitem correlations is given in Table 1.

For all subsequent statistical analyses, the original sample of 500 male patients was reduced to 350 in order to include only those for whom all rating and psychological test data were complete;

---

[4] The rating scales used in this study have been deposited with the American Documentation Institute. Order Document No. 6740 from ADI Auxiliary Publications Project, Photoduplication Service, Library of Congress; Washington 25, D. C., remitting in advance $1.75 for microfilm or $2.50 for photocopies. Make checks payable to: Chief, Photoduplication Service, Library of Congress.

[5] The Probable Error of a tetrachoric correlation may be obtained readily by the formula $PE = \frac{.6745\,\pi}{2N}$ when each of the dichotomized distributions has been divided at its midpoint. However, in the present study the distributions were unequally divided for the most part. Under these circumstances, the precise formula for the PE is cumbersome to the point of being economically impossible to apply, particularly in view of the fact that the PE must be computed anew

---

TABLE 1

The Percentages of Significant Interitem Correlations Within and Between Rater Groups

Rater	Physician (%)	Nurse (%)	Aide (%)	Patient (%)
Physician	50	62	46	31
Nurse		75	52	27
Aide			56	25
Patient				57

Note.—r_t = .20 or greater.

and to exclude the group of tuberculosis patients in neuropsychiatric hospitals from these subsequent analyses, since it was considered desirable to include them in a separate study.

Within each of the four scales 50–75% of the correlations are significant as shown in Table 1.[5] When items are compared among scales (i.e., between different categories of raters), the percentage of significant relationships drops. This drop is comparatively small when ratings of personnel are compared, but much larger when patient-personnel ratings are compared. Percentage of significant relationships among personnel ratings is highest between the ratings of nurse and physician (62%); the percentage of significant relationships between aide and physician ratings and aide and nurse ratings are lower (46% and 52%, respectively). In personnel-patient correlations the percentages range from 25% to 31%.

Consideration of these results suggests that the patient's behavior is viewed with some similarity by personnel who rate him and by the patient himself. This lends support to the view that the

for each correlation as the dichotomizing points change.

The dichotomies on which the tetrachoric correlations in Tables 1, 3, and 4, are based may be treated as though they were divided at their midpoints, in order to estimate the conventional significance points. For the sample of 500 cases, this procedure yields an estimated PE of .047. Based on this, correlations of .14 and .19 are required for rejecting the hypothesis of no relationship at, respectively, the .05 and .01 levels of confidence; the chosen correlation value of .20 on which discussion of results is based corresponds to a p value of .01. But it must be kept clearly in mind that these estimates of significance level are systematically inflated over those which would result from the correct formula for the PE. For the reduced sample of 350 cases, the estimated PE is .056; the value of .18 considered significant in Tables 3 and 4 corresponds to a p value of .03.

scales assess some consistent behavioral phenomena in the interpersonal situation of tuberculosis hospitalization.

Development of Indices of Hospital Adjustment

The Hospital Adjustment Index. It was necessary to reduce the 60 hospital adjustment items to a single index of "hospital adjustment" (or a limited number of indices reflecting several aspects of adjustment) in order to facilitate relating this area statistically to various other types of information. Two a priori attempts to derive such an index were made. One, utilizing the skills of the clinical psychologist as a rater, was abandoned when a pilot study showed restricted variations among scores and hence lack of discrimination. An item centered approach, however, was more successful and it was devised in the following manner: First, each item in the four forms was examined in the light of the frequency distribution of its several response alternatives. Where distributions were such that they did not discriminate among patients (i.e., did not provide a sufficiently large range of scores), these items were deleted from further consideration. This was the case, for example, in the items on surgery in the physician's form, the items on unsanctioned discharge in the patient's form, and the nonobjective sentence completion items in the patient's form.

Forty-four of the 60 items remained after this procedure: 4 items from the physician's form, 11 from the nurse's form, 11 from the aide's form, and 18 from the patient's form. Each of these was studied carefully for the purpose of making a clinical judgment as to the meaning of each response possibility with respect to the quality of a patient's adjustment. Then, a 2, 1, 0, or −1 value was assigned to each alternative, with a 2 indicating a response which was believed to reflect the best adjustment to the hospital situation. For example, it was believed that in Item 1 of the physician's form a check at "b," indicating that the patient was seen by his physician as asking for explanations as to his tuberculosis condition an average amount, might well be interpreted as better adjustment than a check at "a" ("asks more than most patients," hence, by implication, extremely anxious or dependent) or at "c" ("seldom asks for explanation"). A check at "b" was hence assigned a value of 2; a check at "a" was assigned a value of 1; and a check at "c" was assigned a value of 0. Minus-one values were assigned in instances where there seemed to be unequivocal evidence of poor adjustment, as the physician rating the patient as being in constant difficulty, the aide rating the patient as getting into trouble because of the use of alcohol, the patient rating the personnel as being usually or most always unpleasant, and the like.

Thus a scoring key for hospital adjustment as reflected in each scale was derived. For each of the four rating forms, these values could be summed algebraically to yield an index of adjustment as seen by each of four people. The sum of these four scores for the individual patient represents the estimate of his over-all hospital adjustment, called the Hospital Adjustment Index.

Table 2 presents the results of the Hospital Adjustment Index (hereinafter referred to as the H-A Index) when applied to the final sample of 350 patients. As can be seen in the table, the mean H-A Index was 45, and the range was 22 to 61; (lowest possible score was −10 and highest possible score was 73). The distribution approximates a normal one.

Factor Scores. In order to broaden the interpretative base of the hospital adjustment measures in this study, an additional procedure was undertaken. This consisted of a factor analysis of 30 items from the Hospital Adjustment Forms, selected to include as broad a sampling as possible of the 60 items in those forms. Ten factors were extracted, but four of these were either composed of only two items with significant loadings or included only complex variables which already were significantly loaded on other factors. Thus, only the following six factors entered into further statistical study: I. Cooperative, II. Positive attitude toward hospital, III. Social activity, IV. Sleep and appetite problems, VII. Passivity to hospital, and X. Difficult to accept patient role.

Each factor has a number of the original individual items with significant loadings. Since all of the items had been previously dichotomized into a plus and minus group to allow for tetrachoric correlations, it was easy to derive a factor score for each individual: a patient's score is the number of factor-associated items on which he fell in the plus group. These factor scores were deter-

TABLE 2

DISTRIBUTION OF HOSPITAL ADJUSTMENT
INDEX SCORES

$(N = 350)$

Score	Frequency
Minus scores:	
22-25	7
26-30	6
31-35	20
36-40	44
41-45	73
Cutoff point	
Plus scores:	
46-50	105
51-55	81
56-60	13
61	1

TABLE 3

RELATIONSHIPS BETWEEN THE H-A INDEX AND SIX
OF THE HOSPITAL ADJUSTMENT FACTORS

Factor	H-A Index (r_t)
I. Cooperative	.61
II. Positive attitude toward hospital	.53
III. Social activity	.48
IV. Sleep and appetite problems	$-.34$
VII. Passivity to hospital	.46
X. Difficulty in accepting role of patient	$-.41$

mined for each patient on all factors; the distributions were dichotomized to provide a plus or minus score for each of the six factors. It was then possible to compute tetrachoric correlations between these factor scores and the other measures in the study.

Table 3 shows the relationships between the factor scores and the H-A Index scores described earlier. The correlations are all statistically significant, which suggests that the H-A Index reflects many of the same features of the rated responses to the hospital adjustment forms as are represented in the factor scores. This finding is not surprising, in view of the method used in developing the H-A Index. As noted above, these additional scores were computed in order to utilize the fullest amount of hospital adjustment data in subsequent relating of hospital adjustment to other measures.

Relationships to Other Data

Up to this point, the discussion has centered about the procedures used and the results obtained within the area of hospital adjustment. The present section will consider the relationships obtained between the hospital adjustment data and selected demographic and psychological test data.

Table 4 contains the correlations between the hospital adjustment data (both index and factors) and the demographic and psychological test data. With respect to the method of computing the correlations for the six factors, it will be remembered that factor scores were used; the resulting distributions for each factor were dichotomized, and then tetrachoric correlations were computed between these and other data. By dichotomizing the H-A Index distribution, the same procedure was followed.

As has been indicated in the preceding section, correlations of .18 or greater were considered statistically significant.

It is apparent that none of the correlations shown in Table 4 is sufficiently large to account for a high percentage of the variance, and thus one is hard put to talk about the results obtained here in terms of "degree of predictability."

Nevertheless, there are a number of significant correlations, pointing to relationships we can examine. These correlations cluster themselves about a few nodal points, which might be labeled "Youth," "Positive attitude toward the hospital," and "Passivity." We shall discuss them in that order.

Youth (defined as being 39 years of age or less) correlates significantly with five of the six factor scores and with the H-A Index. The young group is not cooperative, has a negative attitude toward the hospital, and gets low scores on the H-A Index. At the same time, these patients are socially active and tend to be without sleep and appetite problems.

Positive attitude toward the hospital attracts attention because of its number of significant relationships with other variables. For this reason, too, it may be seen as a "bridging" factor, in the attempt to get at the interactional aspects of the data. The most striking common feature of the variables significantly related to this factor is the negative psychological connotation. To cite some of these characteristics, the patients with positive attitudes toward the hospital can be characterized by the following: low intellectual achievement, low intelligence, not "bright" (Cattell Factor B), and lacking in "independent security." Even the positive relationship with the Cattell "trustfulness" factor could be interpreted to suggest a lack of psychological strength, in the sense of sheep-like acquiescence.

Passivity, as Youth and Positive attitude toward the hospital, has a large number of significant intercorrelations if one considers together passivity as defined by the projective tests and by Hospital Adjustment Factor VII (an at least tentatively acceptable procedure). The results suggest that the passive patient is the cooperative indi-

vidual who finds little difficulty in accepting the role of a tuberculosis patient. He scores high on the H–A Index. He is free from anxiety (at least the type found in the projective score) and, as might be expected, is not endowed with much independent security. The contrast between passivity and difficulty in accepting the role of patient is rather strikingly shown by comparing the

Factor VII (Passivity to hospital) and Factor X (Difficult to accept patient roles) columns; one is struck by the frequency in which the sign of one factor is the opposite of the other in each pair of correlations.

The three areas which have been considered represent what are felt to be the most important correlational clusters in the data of Table 4. They derive their impor-

TABLE 4

RELATIONSHIPS BETWEEN HOSPITAL ADJUSTMENT DATA AND SELECTED DEMOGRAPHIC AND PSYCHOLOGICAL TEST DATA

				Factors			
Data	H-A Index	I Coopera-tive	II Positive Attitude to Hospital	III Social Activity	IV Sleep Problems	VII Passivity to Hospital	X Patient Role Hard
Demographic:							
Age (39 years or less)	−.18*	−.25*	−.44*	.20*	−.29*	−.08	.19*
Married	.04	−.01	−.01	.13	−.04	−.16	.13
Education (11 grades +)	.07	−.03	−.24*	.17	−.16	−.14	.07
Occupation (white collar)	.15	.27*	.01	.09	.12	−.03	.09
Composite Projective Test Scores:							
Family important	−.08	.04	−.22*	.18*	−.09	−.15	.13
Passivity	.23*	.35*	.17	.01	−.03	.23*	−.19*
Anxiety	.07	.08	−.05	.02	.21*	−.25*	.02
Independent security	−.15	−.05	−.35*	−.09	−.04	−.26*	.17
Psychological Tests:							
PTI (Intelligence)	−.04	.04	−.35*	.13	.14	.17	.15
Cattell 16 PF test							
MD no distortion	−.16	−.11	−.20*	−.02	−.08	−.09	.20*
A warm, outgoing	.02	−.02	.13	.22*	−.08	.04	.08
B bright	−.10	−.11	−.19*	−ᵃ	−	−	−
C mature	.13	−.01	−.12	.10	−.13	.17	.12
E dominant	.02	−.13	−.07	.13	−.01	.04	.08
F not depressed	−.03	−.05	−.09	.09	.00	−.10	−.04
G conscientious	.04	.16	−.11	.05	.10	.02	−.02
H adventurous	.14	−.02	.20*	.06	.03	.08	−.15
I not sensitive	−.11	−.06	−.02	−.06	−.22*	.11	.02
L trustful	.14	.04	.28*	−.06	.08	.14	.01
M conventional	.13	.14	.02	.02	−.07	.10	−.12
N sophisticated	−.14	−.07	−.02	−.02	.14	.05	.11
O not anxious	−.07	−.19*	−.09	.05	.20*	−.07	−.09
Q₁ experimenting	−.19*	.04	−.17	−.07	−.05	.00	.03
Q₂ self-sufficient	.01	.07	−.03	−.01	−.06	−.14	−.11
Q₃ controlled	.12	.16	−.05	.18*	−.01	.01	−.11
Q₄ not tense	.14	−.05	.14	.15	−.10	.17	−.12

ᵃ Values not computed.
* Significant at .03 level.

tance from the possibility that they may serve as links in relating hospital adjustment to other areas of interest concerning the tuberculosis patient.

Summary

This section has described the techniques employed in assessing hospital adjustment of tuberculosis patients. Hospital adjustment was defined as consisting of sets of behaviors determined by many factors both within the individual and in his environment. Thus personnel as well as patients were asked to rate the patient's behavior on multiple-choice rating forms. Five hundred male patients, with their associated personnel, participated in this rating. The resulting response distributions for each of the total of 60 items which was rated were dichotomized, and tetrachoric correlations were computed among the items.

In order to relate hospital adjustment to other data in the project, it was necessary to develop an index of hospital adjustment. Three potential methods for reducing the 60 items in the hospital adjustment forms were discussed. Of these three, the H-A Index (the algebraic sum of weighted values assigned to the response alternatives) was deemed most feasible for subsequent statistical computations. This index, as well as six factors which resulted from a factor analysis of 30 of the 60 hospital adjustment items, was then related (via tetrachoric correlations) to selected demographic and psychological test data for a sample of 350 patients. This 7 by 26 matrix was inspected for clusters of correlations, and three such clusters were described.

On the basis of these clusters, it may be concluded that the type of hospital adjustment which is characterized by contentedness in the hospital, ease in cooperating with rules and regulations, and favorably impressing personnel, is more frequently observed among older, more passive patients than in younger, more independent ones. The patient in whom the index and factors indicate this pattern of adjustment is without sleep and appetite problems and is not anxious. He may be somewhat less intelli-

gent than patients who display the obverse pattern, but he gets along well with people around him. In short, he is a person who has little difficulty in accepting the role of a long-term patient, presumably because that role suits his needs and those of hospital personnel very well.

This formulation is broader than hospital behavior, considered alone, since the related variables of background and psychological test variables have been introduced. How these predictor variables relate to physiological aspects of the disease and to posthospital adjustment will be discussed, respectively, in the next two sections.

RELATIONSHIPS BETWEEN PSYCHOLOGICAL VARIABLES AND RESPONSE TO TREATMENT FOR PULMONARY TUBERCULOSIS

As with all medical conditions, some patients seem to recover faster from pulmonary tuberculosis than do others who have the same amount of disease. Does something in their psychological makeup account for this differential rate of recovery? That is the central question of the study which is reported in this section.

Few of the previous research studies of the role of personality variables in tuberculosis have attempted to differentiate between patients who make a good and those who make a poor response to treatment. While Brotman's (1955) research was directed at this question and Ellis and Brown (1950) maintain that their studies using the Rorschach responses substantiate the hypothesis that mental and emotional factors are related to response to treatment, most of the other reports have concerned the role of emotional factors only as they serve to describe tuberculosis patients as a group.

Procedures

A description of the general procedures used in the selection and testing of subjects for the research project has been given previously and will not be repeated at this point. An additional form was used for this portion of the project. Information required to complete a Response to Medical and Surgical Treatment Form included the results of the bacteriological tests of the patient's sputum or gastric content for evidence

of the tubercle bacillus. In addition, information was recorded in regard to the results of the periodic X-ray films as they indicated the progress the patient made toward stability of the disease process and closure of cavities where these had existed as part of the disease. This form was completed by the investigators in consultation with the patient's ward physician.

Complete medical data were obtained on 78 patients.[6] While this is a comparatively small group, it was felt that the importance of this aspect of the research justified statistical analysis of the data. It was our hope that hypotheses might be derived which would provide a basis for more extensive research studies.

Three measures of response to treatment were selected and defined in terms of the rate of achieving certain goals. The rate of bacteriological conversion was defined as the number of months from the date of initiation of chemotherapy to the date of the first of a series of uninterrupted concentrate or culture reports which failed to reveal the presence of tubercle bacilli. X-ray stability rate was defined as the number of months from the date of initial chemotherapy to the date of the first X-ray film which the ward physician considered to show no significant change in the disease process for a period of 3 months. Cavity closure rate was defined as the number of months from the initiation of chemotherapy to the date of the first X-ray film judged by the ward physician to show closure of all cavities which may have existed previously.

It seemed highly desirable that these three measures be combined into a single index of response to treatment and several small studies were conducted to determine the best method to use to accomplish this. A determination of the interrelationships between the three variables, using the data available on the subjects in this phase of the project, revealed the fact that X-ray stability and cavity closure are highly correlated ($r = .92$) and bacteriological remission and X-ray stability are moderately correlated ($r = .66$). It was decided, therefore, that an index consisting of X-ray stability and bacteriological remission would adequately represent all three variables.

In another survey, a questionnaire was devised to sample the attitudes of physicians who were

actively engaged in the treatment of pulmonary tuberculosis. They were requested to indicate their opinions as to the relative importance of bacteriological remission and X-ray stability as indicators of response to treatment. Fifteen physicians, representing five Veterans Administration hospitals[7] participated in filling out this questionnaire. Sixty-seven percent indicated that bacteriological remission is the more important measure, 22% felt X-ray stability to be more important, and ˙.% considered them equal in importance. The mean rating for bacteriological remission (out of a total possible rating of 10) was 6.0 and for X-ray stability was 4.0. This ratio of 1.5 to 1.0 was, therefore, adopted and the Index of Response to Treatment used in this study is made up of 1.5 times the number of months it takes to achieve bacteriological remission plus the months to attain X-ray stability.

A separate survey was also conducted to determine the reliability of judgments of the variable of X-ray stability by physicians who were experienced in the evaluation of X-rays as a measure of response to treatment. Twelve physicians at two Veterans Administration hospitals[8] were asked to indicate which of four X-rays on the same patient represented the one indicating stability. An over-all agreement in rating of 72% was obtained. No study of bacteriological remission data reliability was made but it is probable that it is of satisfactory reliability as it is derived from the use of standard laboratory procedures. It seems justified, therefore, to accept the index as having adequate reliability for this type of rating procedure.

It was next determined that there , was a statistically significant difference in mean index values for the group of patients diagnosed as moderately advanced and far advanced.[9] As a result these two groups of patients have been considered individually in the analysis of the results.

Results

The general plan for analysis of the results was to compute medians for the Index of Response to Treatment scores and for the demographic and psychological variables and to compare patients scoring above and below the medians by the use of four-

[6] The restricted number of subjects available for this phase of the studies probably resulted from the fact that since participation in each phase of the project was voluntary only a limited number of investigators chose to collect data on response to treatment which required a 12- to 18-month wait until all data were available and the completion of a form requiring the detailing of medical information. It is interesting to note that, using demographic data, comparison of the patients available for this study with the total sample revealed no significant differences between the two groups.

[7] Livermore, California; Long Beach, California; San Fernando, California; Downey, Illinois; and Baltimore, Maryland.

[8] Long Beach, California, and San Fernando, California.

[9] The 1955 diagnostic standards of the National Tuberculosis Association were used in the determination of diagnostic categories.

TABLE 5

CHI SQUARES AND PHI COEFFICIENTS FOR RELATIONSHIPS BETWEEN INDEX OF RESPONSE
TO TREATMENT AND DEMOGRAPHIC VARIABLES

Variable[a]	Moderately Advanced (N = 48)		Far Advanced (N = 30)	
	χ^2	ϕ	χ^2	ϕ
Under 40 years of age	.36	.09	.41	.12
Presently married	3.14	.26	.53	−.13
Above 11 years of education	1.42	.18	.00	.00
White collar or better occupation	.42	.11	.72	−.15
None or low government compensation	.24	.07	.28	−.10
No previous admissions for tuberculosis	.49	.10	_b	−
No other medical diagnoses	1.40	.17	.29	−.10

a Description is characteristic of above median group.
b Value not computed inasmuch as all patients but one were first admission.

fold tables. This procedure appeared to be adequately sophisticated for an exploratory study. Chi square has been used for the analysis of data and phi coefficients have been computed to provide an indication of the direction and degree of correlation between the variables.[10] Evidence of statistical significance has been obtained by submitting the chi square values to the appropriate test with one degree of freedom.

It is well to keep in mind the fact that in a study employing a number of variables there is a possibility that a certain number of significant findings may be obtained on a chance basis. Of the 28 psychological variables which were studied, 2 might prove significant at the 5% level by chance alone.

Table 5 presents the comparison of the demographic variables with the Index of Response to Treatment for the moderately advanced group of patients and for the far advanced patients. Inspection of the table reveals that none of the demographic variables is significantly related to response to treatment in either of the diagnostic groups.

---

[10] Correction for continuity was applied when the smallest expected cell frequency was less than 5. The use of a nonparametric statistic was indicated by the fact that frequency distributions of the index scores for both groups appear to be skewed in the direction of high scores or poor response to treatment.

Results of the test of intelligence level and the 16 Personality Factor Test are presented in Table 6. The correlations with the response to treatment index are uniformly low for the group with moderately advanced disease and we must conclude that no evidence of relationships between these variables has been found.

For the far advanced group, however, there is evidence of significant relationships between several of the personality variables and response to treatment. Factor O, not anxious, is significant at the 1% level; Factor Q_1, experimenting, at the 5% level; and Factor MD and the combined anxiety factors are significant at close to the 5% level. The Cattell factor score results will be discussed in terms of the descriptive statements given by the test authors. The reader should bear in mind that the interpretation of meaning to factors is a highly subjective task. This is especially true when each factor is composed of but a small number of items as is the case in the 16 PF test.

The finding that is of the highest degree of statistical significance ($\phi = .58$, estimated $r = .91$) is the relationship between high scores on Factor O of the 16 PF test and good response to treatment. This factor is said by the test authors to measure personal confidence and freedom from anxiety. Persons scoring at this end of the dimension are described in the test manual as tending

to be "placid, calm, with unshakable nerve. He has a mature, unanxious confidence in himself and his capacity to deal with things" (Cattell, 1956). Conversely, patients with far advanced disease who have poor response to treatment tend to have scores on this factor which indicate that they "tend to be depressed, moody, suspicious, brooding, avoiding people. They have a childlike tendency to anxiety in difficulties" (Cattell, 1956).

The second factor on which a relationship to response to treatment is found ($\phi = .38$,

TABLE 6

CHI SQUARES AND PHI COEFFICIENTS FOR RELATIONSHIPS BETWEEN INDEX OF RESPONSE TO TREATMENT AND OBJECTIVE PSYCHOLOGICAL TEST SCORES

Test	Moderately Advanced ($N = 48$)		Far Advanced ($N = 30$)	
	χ^2	ϕ	χ^2	ϕ
PTI Verbal A	.00	.00	.31	.10
Cattell Factors:				
MD no distortion	.36	.09	3.80	.34
A warm, outgoing	2.71	.24	.59	−.15
B bright	.35	.09	.70	.16
C mature	.38	.09	1.70	.24
E dominant	.17	.06	.59	−.15
F not depressed	.36	.09	.59	−.15
G conscientious	1.87	.20	.30	.10
H adventurous	1.40	.17	1.47	−.23
I not sensitive	.00	.00	.62	.15
L trustful	.35	.09	1.47	.23
M conventional	1.48	.18	.59	.15
N sophisticated	.64	.12	.00	.00
O not anxious	.17	.06	9.96**	.58**
Q_1 experimenting	.00	.00	4.83*	.38*
Q_2 self-sufficient	.38	.09	.56	.14
Q_3 controlled	1.44	.18	.36	−.11
Q_4 not tense	.36	.09	.00	.00
Low combined anxiety	.88	−.14	3.74	.37
Low combined neuroticism	.02	.02	.14	.07

* Significant at .05 level.
** Significant at .01 level.

estimated $r = .59$) is Q_1, experimenting versus conservative. Good response to treatment appears to be associated with the person who "tends to be interested in intellectual matters and fundamental issues. He frequently takes issue with ideas, either old or new. He tends to be more well informed, less inclined to moralize, and more tolerant of inconvenience" (Cattell, 1956). Poor response to treatment is found in patients in this study who give scores indicating that they are cautious and opposed to any change.

Two other scores on the 16 PF test may be worthy of attention. Both had chi square values which were close to the 3.84 which is required for significance at the 5% level. The MD scale of the Cattell test yielded a chi square of 3.80. This scale was designed as a measure of reliability of answers and may be considered as a rough measure of the amount of distortion present in the answers. The results suggest that patients with far advanced disease who respond to treatment slowly tend to have less reliable Cattell scores.

In addition to the usual scoring of the 16 PF test, two scores representing a combination of factor scores were computed.[11] One of these—neuroticism—did not significantly relate to response to treatment in either group. The other—anxiety—yielded a chi square of 3.74 and a phi coefficient of .37 with the index for the far advanced group. This measure is made up of a combination of scores on Factors L, O, Q_3 and Q_4. In several research studies these factors have been found to constitute among the best markers of the anxiety factor, designated UI24 in the Universal Index System proposed by Cattell (1957). One of the factors—O—has been previously discussed as being significantly related to response to treatment.

Results of the comparison of the projective test variables with response to treatment are given in Table 7. None of the findings is of statistical significance for either diagnostic group.

[11] I. H. Scheier, personal communication, 1959.

TABLE 7

CHI SQUARES AND PHI COEFFICIENTS FOR RELATION-
SHIP OF INDEX OF RESPONSE TO TREATMENT
TO THE COMPOSITE PROJECTIVE
TEST SCORES

Composite Projective Scores	Moderately Advanced (N = 48)		Far Advanced (N = 30)	
	χ^2	ϕ	χ^2	ϕ
Family important	.00	.00	1.47	−.23
Evasion	1.87	.20	1.70	.24
Passivity	.36	.09	.30	−.10
Anxiety	.40	.09	.00	.00
Moral judgment	.00	.00	1.70	.24
Control	3.33	.27	.28	−.10
Independent security	.00	.00	.30	.10

Perhaps of greater practical importance than the foregoing analysis of the results is the development of a regression equation for use in the prediction of response to treatment from known values for the psychological test variables. Application of such an equation to a new group of patients would permit a test of the validity of the findings and an evaluation of the potential usefulness of the findings in the hospital treatment program.

The lack of significant results for the patient with moderate disease argues against any attempt to use these findings for predictive purposes. Development of a regression equation for the far advanced group would, on the other hand, appear to be fruitful.

The three Cattell scores, MD, O, and Q_1, which have a statistically significant correlation with the Index of Response to Treatment were selected for the multiple regression equation. Means, standard deviations, and intercorrelations for these factors are shown in Table 8.

A multiple phi coefficient of correlation between these three factors and the Index of Response to Treatment is .70. This value may be compared with the highest single correlation of .58 between the index and Factor O. The use of the multiple factors in the regression equation appears to be of value, therefore, as it results in a 15% increase in the variance that can be accounted for in the prediction of the index. The regression equation resulting from the use of the data in Table 8 is as follows: $X_{RT} = 1.53X_1 + 2.79X_2 + 2.04X_3 − 17.56$. X_{RT} is the response to treatment index score, X_1 the stanine standard score on Factor MD, X_2 the stanine standard score on Factor O, and X_3 the stanine standard score on Factor Q_1.

Discussion

This investigation of relationships between psychological variables and response to treatment in pulmonary tuberculosis has been essentially exploratory in nature. No specific hypotheses were formulated prior to initiation of the study. The general plan was to present tests which would represent a wide sampling of psychological variables. The results might then provide a source for hypotheses which could be tested in subse-

TABLE 8

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION VALUES FOR THREE CATTELL FACTOR SCORES
AND THE RESPONSE TO TREATMENT INDEX FOR THE GROUP WITH FAR ADVANCED DISEASE

Variable	Mean	SD	Intercorrelation (ϕ)		
			Factor MD	Factor O	Factor Q_1
Response to Treatment Index score	19.7	10.7	.34	.58	.38
Factor MD	5.0	1.9		.14	.00
Factor O	6.8	1.9			.15
Factor Q_1	5.2	1.6			

quent research. An additional goal was the formulation of a method for predicting response to treatment such as has been described in the preceding section.

The results have indicated that for the patients with moderately advanced pulmonary tuberculosis none of the demographic or psychological variables which were included in the study has a significant relationship to response to treatment. Results obtained for the group of patients with far advanced disease, on the other hand, have indicated that certain of the psychological variables do appear to be significantly related to response to treatment. More evidences of such relationships were obtained than would be expected by chance.

The findings may be interpreted as suggesting the hypothesis that patients with far advanced disease who are relatively free from anxiety reactions during their hospitalization will be likely to have a good response to treatment. The personality test results indicate that this freedom from anxiety may result from a secure personality structure, from an effective use of defenses such as withdrawal, or from such traits as passivity and submissiveness.

The principle basis for such a hypothesis comes from the significant correlation obtained for Factor O of the Cattell test. The score on this scale is a principle marker for the general anxiety factor and appears to indicate a state of personal security and freedom from proneness to guilt reactions. The patient scoring high on this factor should be able to tolerate the stresses which result from hospitalization for tuberculosis without excessive anxiety. The other two factors which are most highly related to response to treatment may also be interpreted as being consistent with the hypothesis. The score on Factor MD apparently indicates that patients who do well have relatively less need to distort their answers in a defensive or unreliable manner. Factor Q_1 appears to reflect a flexibility of personality which would permit the patient to adapt himself to the hospital situation with a minimum of anxiety.

The disparity between the results obtained for the patients with moderately advanced disease and those that have been found for the group with far advanced disease presents a difficult problem in interpretation. Why should relationships be found between psychological variables and response to treatment in one group and no evidence of similar relationships be seen in another group that differs only in severity of disease at the outset of treatment? One possible explanation might hold that there are two processes involved in response to treatment and that these relate in an antagonistic manner. The first is the physiological ability of the host organism to use chemotherapy to inhibit the disease process and promote the healing recovery from the disease. A second process would be the psychological reactions which may deter recovery. With lesser states of disease the potentiality of the recovery processes might be of sufficient vigor to outweigh the deterent effects of psychological factors. Only when the disease is severe and therapy is relatively impotent would psychological variables exert an important influence.

If this explanation is a valid one, the results of the present study would be expected to show tendencies to relationships in the group with moderately advanced disease for the same variables that are significantly related in the group with far advanced disease. This would follow from the fact that the two diagnostic groups are not discrete but represent a continuum of severity which has been artificially forced into two groups. However, no such pattern of results has been noted for the two groups. Where variables are significant for the group with far advanced disease there is little evidence of correlation for the group with moderately advanced disease and there are many instances in which the two groups correlate in opposite directions.

A tenable explanation of the differences between the groups must apparently evolve from the discovery of differences in composition of the groups other than the dimension of severity. One obvious disparity is that the two groups differ in the number of patients included who have cavitary disease. All of the patients with far advanced disease have cavities and in most cases they

are bilateral. Fifty percent of the patients of the group with moderately advanced disease, however, have no cavitation and there are no instances of bilateral cavitation. If cavitation is indeed the essential difference between the groups, it might be considered that the results suggest that the primary effect of psychological factors on tuberculous disease is exerted on the process by which cavity tissue damage is resolved.

A more elaborate research project to test the hypothesized relationship between anxiety and response to treatment is currently being pursued.[12] The design of this investigation provides for psychological tests which are more sensitive to the anxiety factor. In addition, measures of autonomic nervous system and adrenal-pituitary functions are being obtained. These measures will be repeated at several stages in the treatment program and will be related to response to treatment using data similar to that used in the present study.

The development of a multiple regression equation for the prediction of response to treatment for patients with far advanced disease from three of the Cattell scores constitutes a result of the present study that is primarily practical rather than theoretical. If the validity of the predictions is supported by further investigation, they should allow for the use of therapeutic techniques to counter elements in the patient's psychological patterns which may mitigate against good response to treatment and allow for the achievement of optimum results in the treatment program. It is important to note, however, that the use of the prediction in its present state is subject to all of the cautions that must accompany data which have not been put to the crucial test of cross-validation. An essential followup of the present investigation is the use of the regression equation with a new group of patients and the computation of the statistical relationship between the predicted response to treatment index scores and those obtained from the actual clinical records.

---

[12] Designated as Project 6 of the Cooperative Psychological Research Program.

ADJUSTMENT ON RETURN TO THE COMMUNITY

Earlier sections have shown how tuberculosis patients face a considerable challenge to their ability to cope with long-term hospitalization. On their return home they again must adjust; this time to appropriate family and community living. In spite of their expectations, the home situation will not have remained static. When one is present the environment frequently changes in small ways, but people meet these variations almost automatically. After being away for many months, however, these small changes may accumulate to give a noticeably different aspect to the situation.

In addition to this source of change, others may occur because of the patient's absence. For example, circumstances may have required his wife to take over the role as head of the family in his absence. She may have had to accept some type of relief, or perhaps have gone to work to support the family. If this necessitated a baby sitter, that person may have earned a spot in the affections of the family during the patient's absence. His wife's increased self-reliance and sense of responsibility, and the money she has been earning, may be part of the changed reality he will face on returning home.

Some of his readjustment problems in the community also may be compounded by the role the patient assumed in the hospital. The attitude of dependency, often found with long-term hospitalization, may prove difficult to shed as he resumes his role as head of the household. Many workers in this field can cite instances of another attitude which can be carried over from hospital days: a patient is worried about relapse and thus is afraid to start working again despite reassurances from his physician. Sometimes, another residual of his hospitalization may carry over in the form of an overreaction to the restriction on his independence which he felt as a patient. Such an individual may have difficulty in accepting normal authority or the usual limitations at home or on the job.

This phase of the project was designed to evaluate readjustment to the community, and to study the relationship of demographic information, and of psychological test variables to this criterion. A first goal was to develop an index of community adjustment which might be used in a number of comparisons.

Adjustment to the community is here defined as a global response pattern which will enable an expatient to get along most smoothly and happily within the culture. A logical analysis would suggest that a good adjustment would find the discharged patient playing an active and productive role in the community. He would be working if at all possible. He would be friendly and sociable rather than hostile or antisocial. Beyond assuming responsibility for himself and his family, he would work on whatever activities he could that might better his neighborhood and community. These behaviors are some of the major dimensions one might expect from a community adjustment measure, if middle class views of what constitutes a successful adjustment are followed (Warner, Meeker, & Eells, 1949). Widely held values of most former patients and hospital staff would include working, being sociable, helping others, and feeling well, as part of a good community readjustment.

Obviously the minority who did not hold these views prior to hospitalization would not be expected to change because of the time spent in the hospital per se. The investigation of relationships between prehospital and posthospital levels of adjustment will be part of a future study. The present project is concerned with the relationships between posthospital adjustment and psychological variables.

Procedures

The previously described projects of this cooperative study were conducted with hospitalized patients who, although volunteers, were more available for study than those individuals who already had been discharged to their community. Also adjustment to hospitalization could be judged by a number of independent observers. Response to treatment while in the hospital could be judged

by objective means such as laboratory tests or observed changes on X-rays. To obtain evidence as equally rigorous on their community readjustment would involve gathering information independently from family members, neighbors, friends, and employers, a procedure which was economically unfeasible. Instead, self-reports were obtained through fairly intensive and structured interviews with psychologists. These data, covering most aspects of the subject's activities following his hospital discharge, were recorded by the psychologist on a form during the course of about an hour's interview.

Each interview was obtained at the time of the patient's visit to the hospital for a medical follow-up at least 6 months after hospital discharge. The median time lapse was 15 months after leaving the hospital. Just preceding the interview, these subjects also took the same battery of psychological tests used in the other two protocols. Data were thus collected on 185 male subjects from three follow-up clinics of cooperating hospitals.

Results

As was true for the other two studies the data were processed in the central laboratory. As a first step in processing, the various responses were divided rationally into two fairly even divisions for each of the interview questions. These dichotomies were used in computing tetrachoric correlations of every item with all the others. Fifty-seven of the 64 questions in the interview lent themselves to this treatment. From this table of intercorrelations two matrices were selected to use in factor analysis. Some groupings of high intercorrelations related to working, while others concerned not working. Since these groupings could not logically be correlated with each other, two matrices were needed. From these factor analyses emerged four more-or-less independent factors. They were labeled "A" and "B" from the one analysis, and "1," "2," and "3" from the other (B and 1 were essentially the same factor found in both matrices).[13]

---

[13] The matrix of items associated with working was factored by James P. O'Conner, Veterans Administration Consultant from the Catholic University of America. A complete description of the two factor analyses is included in a separate publication now in process.

Table 9 shows the interview items with significant loadings on each of the four factors. Factor scores were computed using the same procedure described in the section on hospital adjustment. Similarly, the distribution of scores for each factor was dichotomized to permit the computation of tetrachoric correlations between factor scores and the personal history and psychological variables.

A study of the items with high loadings on each factor provides a subjective basis for the tentative identification of the behavior pattern represented. Factor A would appear to relate to Job Security or Stability. This factor, of course, came from the matrix dealing with job variables for those who were working. The second factor found in this group of items, Factor B, appears to be a reported feeling of good health. This same set of items also came up as Factor 1 in the analysis of the other matrix, since the two overlapped except for the working or not working items.

Factor 2 in the "not-working" matrix has been labeled tentatively Not Doing or Inertia. Subjects high in this trait tend to miss medical rechecks, have no hobbies,

TABLE 9

FACTORS FOUND IN DISCHARGED PATIENT INTERVIEWS

$(N = 185)$

Factor	Variable	Factor Loading (r_t)
A	Job Security—Stability	
	Feels present job is secure	.90ᵃ
	Does not want to change jobs	.61ᵃ
	Present job chosen because of a positive attitude toward a specific, not personal aspect of the work	.59
	No difficulty in getting a job	.51
	Present total income from own salary only	.47ᵃ
	Upward trend in jobs since discharge	.47
	Most leisure time spent in reading and music	.47
B-1	Medical—Health	
	Full work tolerance—7 plus months after discharge	.94
	Feels present health is very good	.72
	No medical restrictions at discharge on type of work	.66
	Currently lives with family	.62
	No physical complaints at present	.60
	No daytime rest recommended by physician at discharge	.58
	Present total income from own salary only	.57ᵃ
	No difficulty in getting a job	.41ᵃ
	Total number of months on present job	.39ᵃ
2	Not Doing—Inertia	
	Has missed one or more medical rechecks	1.00
	Has no hobbies	.70
	Does drink less since discharge	.52
	Not working but does want a job	.47ᵃ
4	No Change Since Illness	
	No changes in organization membership	.77
	No changes in sports participation	.59
	Does not live with family	.53
	Drinks only beer and/or wine	.49
	Does not drink less	.37
	Does not smoke less	.35

ᵃ Variable omitted in subsequent computation of factor scores.

drink less since hospital discharge, and to be "not working, but want a job." These items seem to describe a type of former patient seen by many rehabilitation workers. Such a client might be from a lower socio-economic class (to account for no hobbies), and to be so impressed by the seriousness of his medical condition, and so fearful of a relapse, that he will sit at home doing nothing for much longer than necessary. This factor might also include the passive, poorly motivated person.

The remaining Factor 4, labeled No Change Since Illness, seems less defined than the other three. Four of the six items used to score it involve no change. Two diverse impressions could be formed from a scrutiny of the items with significant loadings on this factor. The constellation might reflect little concern over the implications of the illness and a refusal to allow it to force any changes in previous living patterns. On the other hand, the factor might reflect the group who do not live with families, participate in sports, or belong to organizations; thus, there would be no change in these behaviors. As a part of this pattern, drinking and smoking are considered inviolate rights, and not subject to change. This type of person is often found on the "skid row" of our cities.

A few other factors were found on these analyses, but were not too well defined and included primarily complex variables with significant loadings on other factors.

Table 10 shows the interrelationships among the four major factors. Each relates to the one following it on the listing, and

these correlations seem to make good sense psychologically. The .40 between Job Stability and Health factors could suggest that good health keeps one on the job, as well as the obverse, that feeling happy and secure in one's job relaxes tensions and promotes health.

The Health and Inertia factors correlate −.31. The items here suggest that those who have missed medical rechecks are perhaps showing a fear of what the physician might find as well as the inertia implied by the factor label. Their "drinking less since discharge from the hospital," and "not working yet wanting a job," also suggest people who lack confidence in their health status, which is more or less opposite from those high on Factor B-1, who exude confidence in their health.

The last two factors, representing inertia and no change correlate −.51. The less the inertia the more there is no change since illness. If we accept the prior reasoning that the inertia shown is due to a fear of the consequences of activity on his health, and that the No Change factor shows a proper de-emphasis of the risk of a relapse, one would expect them to work against each other to a fairly strong degree. Some of these relationships may also be explained because of the one item common to both.

Table 11 gives the tetrachoric correlations of the four factors just described, with the seven demographic variables and the 25 psychological test variables.

From a review of the obtained values, the Job Stability factor is significantly related to being married and in a white collar occupa-

TABLE 10

FACTOR INTERRELATIONSHIPS—DISCHARGED PATIENT INTERVIEW

Factor	Description	Intercorrelations			
		A	B-1	2	4
A	Job Security		.40	−.16	−.07
B-1	Medical—Health			−.31	−.12
2	Not Doing—Inertia				−.51
4	No Change Since Illness				

TABLE 11

CORRELATION MATRIX OF DEMOGRAPHIC AND PSYCHOLOGICAL TEST VARIABLES WITH THE
FOUR DISCHARGED PATIENT INTERVIEW FACTORS

($N = 185$)

Variable	Factors			
	A-1 Job Security	B-1 Medical— Health	2 Inertia	4 No Change
Demographic Data:				
Young age (39 and under)	−.04	.44**	−.13	.09
Married	.27**	.34**	−.09	.14
Education (11 plus grades)	.21*	.28**	−.40**	.03
Low compensation ($65 per month or less)	.21*	.13	−.15*	.21**
Occupation (white collar)	.30**	.22**	−.32**	−.12
No previous TB hospitalizations	−.02	.16*	−.11	.17*
No other medical diagnoses	.05	.20**	.09	−.22**
Psychological Test Scores:				
PTI (intelligence)	.20*	.34**	−.42**	.04
Cattell 16 PF test				
MD no distortion	.19*	−.13	.16*	.20**
A warm, outgoing	.03	.05	−.11	−.16*
B bright	.10	.13	−.23**	.09
C mature	.32**	.42**	−.04	.03
E dominant	.04	.00	−.12	.05
F not depressed	.18*	.26**	−.11	−.04
G conscientious	.31**	.16*	−.17*	.03
H adventurous	.06	.00	−.08	.04
I not sensitive	−.23**	−.04	.04	−.06
L trustful	.16*	.28**	−.09	−.05
M conventional	.12	.11	.08	−.17*
N sophisticated	−.24**	−.12	.02	−.03
O not anxious	.11	.03	.10	−.12
Q_1 experimenting	.15*	.16*	−.03	.08
Q_2 self-sufficient	.21*	−.04	−.25**	.13
Q_3 controlled	.07	.23**	.07	−.16*
Q_4 tense	.07	.10	−.11	.01
Composite Projective Test Scores:				
Family important	.25**	.31**	.06	−.20**
Evasion	−.10	.02	−.03	.13
Passivity	.10	−.16*	.04	.22**
Anxiety	.02	.10	−.01	−.08
Moral judgment	.18*	.20**	−.07	.08
Control	.10	.22**	−.17*	.07
Independent security	.38**	.18*	−.28**	−.05

* Significant at the .05 level.
** Significant at the .01 level.

tion. From the psychological test data these types of people can be described as emotionally mature, conscientious, not sensitive, and sophisticated, as well as aware of the importance of family, and needing independent security.

Factor B-1, a feeling of good health, is related significantly to being younger, married, with a better education, a white collar job, and no other medical diagnoses. The psychological tests suggest that these individuals tend to be more intelligent, mature,

not depressed, trustful, and controlled. They likewise believe in the importance of the family, and in judging others in terms of moral values.

The Inertia or Do Nothing factor relates negatively to education, and white collar types of jobs. The factor also is related to dullness, dependency, and a low need for independent structure.

In general all the correlations of Table 11 are fairly low. The highest is .44. While 34 relationships out of a possible 128 are statistically significant at about the 1% level, none of these is high enough to be of much practical value.

The Development and Refinement of an Index of Community Adjustment. The statistical analysis to this point has produced four main factors of what constitutes adjustment to the community. Although some precision might be lost in the process, it was considered desirable to further condense these measures into a single scale which could be used in qualitatively rating the level of adjustment made by a former patient. The possibility of such combination was enhanced by the interrelationships between factors found in Table 10. Some of the correlations here and in Table 11 suggest, for example, that Factors A and B-1, involving feelings of job security and good health, would be on the positive end of an adjustment continuum, while the Inertia factor would be toward the opposite end of that scale. Factor 4, the No Change component, would appear on the negative side, but less extreme.

The importance of providing for cross-validation of this index brings in a limiting consideration. The subjects used in this study were not studied while patients in the hospital, but only as they returned for medical follow-up examinations. Those subjects used in studies reported in the previous two sections, however, were involved in the midst of their hospitalization for tuberculosis. Psychological test results as well as data on their adjustment to hospitalization and/or their response to treatment are already available. This group then appears to be the most appropriate to use in validating an index of community adjustment

which is to be developed from data of this study. Using that group will also permit comparisons between hospital adjustment and subsequent community readjustment on the same individuals.[14] The psychometrics for this present study were usually given on the same day as the follow-up interview with the psychologist. Thus it represents an attempt at concurrent prediction. Since the proposed followup on those subjects studied first as hospital patients would take place a year or so later, this permits an attempt at prediction over time which would be more desirable.

For followup on these former subjects, a more concise and less time consuming interview form was needed. It was also considered expedient that this form be prepared so it could be mailed out to those subjects who missed their follow-up appointments. Where the original questionnaire of 64 specific response items, on 10 pages, took about an hour for the psychologist to complete, the revised form contained 12 open-ended questions on 3 pages. These can be filled out by either the psychologist or the subject in about 5 minutes. The simplified questionnaire did not include all the variables which contribute to the four factor scores, because the results of those factor analyses were not yet available when the revision was made. If an over-all Index of Community Adjustment is to be developed from the results of the factor analyses, and cross-validated on the subjects from Studies 1 and 2, it should include only those items which are found in the revised and simplified questionnaire. Out of the 21 variables used to compute factor scores, 10 were found to be available in the new questionnaire. These 10 items were used to make up the Index of Community Adjustment, and are listed in Table 12.

These questions selected from the Inertia and the No Change factors were reversed in their wording so as to give the index items a consistent positive direction. Thus, the higher the index score, the better the adjustment to the community.

---

[14] This is a study designated as Project 5 in the Cooperative Psychological Research Program.

TABLE 12

ITEMS USED IN COMMUNITY ADJUSTMENT INDEX

Item	Factor Source	Factor Loading
Does not want to change jobs (plans to continue in present work)	Job Security	.61
Leisure time spent in reading or music	Job Security	.37
Feels present health is good	Health	.72
Currently lives with family	No Change (reversed)	.53
No physical complaints	Health	.60
Full work tolerance—7 plus months after discharge	Health	.94
Some changes since illness (re: organizational membership or sports participation)	No Change (reversed)	.77
Does smoke less since illness	No Change (reversed)	.35
Has some hobbies	Inertia (reversed)	.70
Plays some sports now[a]	Health	

[a] This item was dropped from consideration in original factor matrices because of an r_t of .99 with the work tolerance item.

Table 13 shows the distribution of index scores. These appear to be fairly well distributed with a tapering off at both ends, and they spread themselves throughout the full range of the available scores.

Since this Community Adjustment index is to be used as a measuring device, its items were studied to make sure that each was contributing properly to the index score. The level of difficulty and the index of discrimination were used for this purpose.[15]

The index items in Table 14 are arranged in order of difficulty level (defined as percentage scored plus) and vary from 82% to a low of 27%, with an average of 52%, which may be considered a fairly good distribution. The index of discrimination is calculated as the difference in percentage scored plus between the top and bottom 27% as judged by the total adjustment score. Because of only a 10-item scale the top and bottom 27% could only be approximated, but the level of discrimination is quite high with 6 of the 10 items having a difference of +50% or better, and 9 of the 10 showing +40% or better. The least discriminating item is "Most of his leisure time is spent at reading or music," and this still

[15] On the interview record those factual items which were present and thus could be scored plus, were treated in the same way as if they were a question answered correctly on an achievement test.

favors the higher group by 28%. Within the limits of the study so far, this index appears to be quite usable.

A small pilot reliability study of the index was conducted under conditions which would be expected to lower the results obtained. The original extensive interviews with the psychologist at one hospital were used for the first calculation of the index scores. About 18 months later the revised and simplified form of the questionnaire was mailed to the same group at home. Of the 145 sent out, 75 were completed and returned. The correlation between the index scores calculated from these two question-

TABLE 13

DISTRIBUTION OF SCORES OF COMMUNITY ADJUSTMENT INDEX
(N = 150 discharged cases)

Score	Frequency
10	1
9	2
8	11
7	9
6	24
5	24
4	26
3	23
2	20
1	7
0	3
M = 4.4	σ = 2.1

naires was .81 which seems fairly good considering the time lag, the changed form of the questionnaires, and the different method of administration.

Information on the validity of the index would be very difficult to obtain since it would involve some independent value judgments as to the quality or level of the subject's readjustment to the community. Those in the best position to observe this would also be those most liable to bias due to emotional involvement with the veteran. While a number of the items included in the scale could be verified by a trained interviewer visiting the home, such a program would not be feasible.

The Index of Community Adjustment was then correlated with the biographical and psychological data. Results are given in Table 15.

All of the significant correlations are in the expected direction. That is, people tend to adjust better if they are more intelligent, have a higher level of education, are toward the professional end of the scale of occupations, and are younger. Higher levels of anxiety or neuroticism tend to interfere with successful readjustment to community life. Similarly, good adjustment scores are associated with maturity, nondepression, and emotional control.

Within the framework of this present cooperative research project in tuberculosis, this index will serve a very useful role in studies of the relationship of type or level of adjustment to hospitalization, and of response to medical treatment to subsequent community adjustment.

Summary

This portion of the Veterans Administration Cooperative Psychological Research Program was concerned with the readjustment of patients on return to their home community. Also to be investigated were the relationships between selected demographic and psychological data and this community adjustment. An important phase of the work was the development of a single index score which would reflect the level of the subject's community adjustment.

The procedure involved collecting data from the subject's hospital record, and administering a battery of psychological tests, followed by a long and structured interview covering a wide range of behaviors. Two factor analyses of the interview data yielded

TABLE 14

DIFFICULTY LEVEL AND INDEX OF DISCRIMINATION OF ITEMS USED IN THE
INDEX OF COMMUNITY ADJUSTMENT

Item	Level of Difficulty (% scored plus)	Index of Discrimination		
		Bottom 20% (Scores 0-2) ($N = 30$)	Top 31% (Scores 6-10) ($N = 47$)	Difference
Currently lives with family	82%	13 (43%)	43 (91%)	48%
Full work tolerance 7 plus months after discharge	71	5 (17)	45 (96)	79
No physical complaints	62	7 (23)	40 (85)	62
Does not want to change jobs	60	0 (0)	32 (68)	68
Does have some hobbies	53	2 (7)	28 (60)	53
Most leisure time—reading or music	44	5 (17)	21 (45)	28
Feels present health is very good	44	2 (7)	37 (79)	72
Does smoke less since illness	39	3 (13)	25 (53)	40
Some changes since illness	35	7 (23)	29 (62)	39
Does participate in some sports	27	1 (3)	25 (53)	50
Average	52%	15%	69%	54%

TABLE 15

RELATIONSHIPS BETWEEN THE INDEX OF COMMUNITY
ADJUSTMENT AND OTHER VARIABLES
($N = 150$)

Variable	Index of Community Adjustment
Young age (under 40)	.27**
Married	.33**
Education	.26**
Occupation (white collar)	.38**
Low compensation	.34**
No previous TB admissions	.30**
No other medical diagnoses	.15
PTI (intelligence)	.46**
Cattell 16 PF test:	
MD no distortion	−.08
A warm, outgoing	.12
B bright	.26**
C mature	.40**
E dominant	.05
F not depressed	.51**
G conscientious	.00
H adventurous	.25**
I not sensitive	.01
L trustful	.03
M conventional	.10
N sophisticated	−.11
O not anxious	.06
Q_1 experimenting	.22**
Q_2 self-sufficient	.16*
Q_3 controlled	.40**
Q_4 not tense	.29**
Composite Projective Test Scores:	
Family important	.42**
Evasion	−.08
Passivity	.25**
Anxiety	.10
Moral judgment	.14
Control	.19*
Independent security	.38**
Low combined anxiety scale score	.42**
Low combined neuroticism scale score	.49**

* Significant at the .05 level.
** Significant at the .01 level.

four main factors which seemed to relate to job security, health, inertia, and lack of change following illness. The interview items with high loadings on these factors and which could be scored from a shortened and simplified version of the interview form were combined to make a 10-item Commu-nity Adjustment index. The items of this index were studied for difficulty level and degree of discrimination. A short reliability study of the index also was reported. These procedures seem to indicate that the index is satisfactory.

The relationships between selected psychological and background data and the Community Adjustment index were computed. The results of these procedures are what might be expected, with those subjects obtaining the highest scores who were younger, more intelligent, better educated, and at the white collar end of the occupational scale.

The psychological data associated with good community adjustment included nondistortion of the environment, maturity, no depression, low anxiety, nonneuroticism, good emotional control, and a high regard for the importance of the family. The results are consistent with a definition of good adjustment to a culture characterized by a predominantly middle class value system.

SUMMARY AND IMPLICATIONS

The three projects described in this monograph are the first in a planned series of studies of the psychological and social aspects of physical disease which is being undertaken cooperatively by psychologists in a number of Veterans Administration hospitals. The major rationale underlying these studies is that the manner in which an individual adjusts to the complex changes in his life pattern brought about by somatic illness depends to a large extent upon psychological and social factors in his life. Pulmonary tuberculosis is a particularly appropriate group for study because of the gross change in the patient's life pattern which is necessitated by current methods of treatment. Because the disease is contagious, the patient is kept restricted even though feeling well. The treatment takes many months and often results in the disruption of occupational and social adjustments. In short, tuberculosis presents a great challenge to a patient's modes of adjustment.

Each of the three projects concerned itself with a significant aspect of the process of adjusting to pulmonary tuberculosis and its treatment. The first studied the quality of the patient's adjustment to hospitalization. Independent ratings by his physician, the charge nurse, the aide who knew him best, and the patient himself were used to establish the criterion measure.

The second area of study concerned the patient's response to treatment in terms of how rapidly he recovered. The criterion was based on X-ray evidence and on the results of laboratory tests showing the conversion of the patient's sputum or gastric content to a noninfectious status.

In the third study, the quality of the patient's adjustment on return to his home community became the criterion. This was judged from an intensive structured interview with a psychologist and was obtained when the patient returned to the hospital for a medical followup at least 6 months after leaving the hospital.

Certain procedures were uniformly carried out on all of the subjects used for the three studies. The same medical, social, and demographic data forms were administered to all, as was an identical battery of psychological tests. In the selection of the psychometric measures the basic requirements were that the tests should measure validly over a wide range of ability levels, be easy to administer and score, and provide a short testing session that would not overtire the patients. Many commonly used tests were inappropriate for use because of these special requirements. The battery selected included a 5-minute, wide range intelligence test—the Personnel Test for Industry, Verbal Test A; the Cattell 16 Personality Factor Test—an objective personality measure derived by factor analysis; a semi-structured personality measure—the Madison Sentence Completion Test which was originally prepared especially for tuberculosis patients; and finally, a projective test—the House-Tree-Person Test, of which only the person drawings were scored.

This project was viewed as a preliminary investigation to screen a large mass of data for significant relationships. Later studies could then be undertaken to more specifically and rigorously test hypotheses which are suggested by the results. In each section relationships between the psychological and demographic data and the criterion measures were determined, and the implications were discussed. Each area will be summarized separately before interrelationships between the studies are discussed.

Hospital Adjustment

Hospital adjustment was seen to be a complex set of behaviors which were determined by factors both within the individual and in his environment. Measures were needed both from the patient and from the hospital personnel who were familiar with his adjustment. A series of multiple-choice rating forms was devised and these were filled out not only by the patient but by the physicians, nurses, and aides who knew the patient best.

In order to arrive at a single index of hospital adjustment which might be related to the other areas of the study, a rational analysis of all rating scale items was performed. Depending on the "goodness of adjustment" which each response choice reflected, a numerical value, ranging from $+2$ through -1, was assigned. On this basis, a total Hospital Adjustment Index score was computed. A sample of 350 nonpsychiatric tuberculosis patients on whom there was complete data was scored in this manner.

In addition, a factor analysis of the hospital adjustment ratings was performed and six of the factors which were extracted entered into further analysis: I. Cooperative, II. Positive attitude toward the hospital, III. Social activity, IV. Sleep and appetite problems, VII. Passivity to hospital, and X. Difficulty in accepting role of patient. Both the Hospital Adjustment Index and the scores derived from the factors were then correlated with the demographic and psychological test data. Although none of the resulting tetrachoric correlations was high enough to allow reliable individual prediction, a number of statistically significant correlations seemed

to group themselves into clusters which could meaningfully be studied. These were discussed under the headings "Youth," "Attitude toward the hospital," and "Passivity."

Younger patients appear to be less cooperative with hospital rules and regulations and tend to have a negative attitude toward the hospital. They are socially active, however, and generally without sleep and appetite problems. Patients with positive attitudes toward the hospital tend to be intellectually less bright and to lack "independent security." Passivity seems to be associated with cooperativeness and ease in accepting the role of the tuberculous patient. The passive patient (as with persons who have a positive attitude toward the hospital) scores high on the Hospital Adjustment Index and is not endowed with much independent security.

Response to Treatment

The aim of this project was to explore the relationships between psychosocial data and the patient's response to medical treatment of his tuberculosis condition. Relatively rigid criteria for inclusion of a patient in this project resulted in an N of 78, drawn from the much larger patient population of the over-all study.

Three measures were selected and defined as important indications of progress in a patient's medical condition. The first was the rate of conversion of the patient's sputum or gastric content from showing evidence of the tubercle bacilli to a "negative" state where none is found. The second was the number of months after the initiation of chemotherapy required to achieve X-ray stability, a condition of unchanging X-rays over a 3-month period. The third was the number of months required for cavities (if initially present) to be considered closed by X-ray examination. The second and third measures were found to be highly correlated; therefore, only the former was used in an additive combination with the first measure to arrive at an Index of Response to Treatment. When this index was applied to the 78 patients, a significant mean difference was found between the

patients with far advanced and moderately advanced disease. Thus, they were considered separately in subsequently statistical analysis.

No significant relationships were found between the psychological or demographic variables and response to treatment in the moderately advanced group. In the far advanced group, however, freedom from anxiety was found to be significantly related to good response to treatment. The data suggested that this freedom from anxiety was based on a secure personality structure, on effective use of defenses such as withdrawal, or on traits such as passivity and submissiveness.

Of considerable interest—both theoretical and practical—is the disparity of results between the two diagnostic groups. It was felt that the difference between the groups may rest in differences in composition of the groups along other dimensions than that of severity. For example, an obvious difference existed between the groups with respect to the incidence of cavitary disease; perhaps the primary effect of psychological factors on tuberculous disease is exerted on the process by which cavitary tissue damage is resolved.

A multiple regression equation was constructed from three factors of the 16 PF test. This provided an index which predicts response to treatment among patients with far advanced tuberculosis better than any single factor alone. If the level of prediction of this equation holds up in cross-validation, it should provide a very valuable aid in structuring the treatment setting for such patients.

Community Adjustment

The purpose of this project was to relate psychological and other variables to the posthospital community adjustment made by the patient after discharge from the hospital. In order to assess community adjustment, a lengthy interview with each of 185 former patients was conducted. These individuals also took psychological tests, and studies were made of their medical folders. The

interview item responses were dichotomized and tetrachoric intercorrelations computed. Two factor analyses were then performed. One of the two factors extracted from the first and one of the three extracted from the second proved to be virtually identical. Thus, a total of four more-or-less independent factors was derived from the two matrices. These were Job Security-Stability, Medical-Health, Not Doing-Inertia, and No Change Since Illness.

Ten items were drawn from the interview data, on the basis of their high factor loadings on the four factors. These items were combined to form a Community Adjustment index and they were studied for difficulty level and degree of discrimination. The results of this and of a short reliability study of the index suggested that it was a satisfactory one for use in subsequent procedures and computations.

The index was then related to psychological and demographic data. The former patients who were younger, more intelligent, better educated, and employed in white collar work appeared to be making the better posthospital adjustment. With respect to psychological tests, no distortion of the environment, maturity, lack of depression, low anxiety, nonneuroticism, good emotional control, and a high regard for the importance of the family were associated with better community adjustment following hospitalization. These findings were seen as consistent with the definition of good adjustment to a culture characterized by a predominantly middle class value system.

Relationship between Hospital Adjustment and Response to Treatment

It is of interest to ask whether good hospital adjustment is related to good progress in recovery from tuberculosis. To answer this question the index measures obtained in the studies of these two areas of behavior were correlated. A phi correlation of .00 was obtained for the moderately advanced disease group. The correlation for the far advanced group, on the other hand, was .40 and the chi square 4.82. This relationship is significant at the .05 level.

It is obviously not possible for this study to answer the question as to what is the underlying basis for the correlation which is found in the far advanced group or why a similar correlation is not obtained for the patients with moderate disease. It might be postulated that the correlation is evidence that hospital rules and regulations have truly been arranged so as to facilitate the recovery process. It is perhaps more probable that the correlation reflects common factors which are related to each of the indices. One such factor might be the relative freedom from anxiety which has been found to be significantly related to both hospital adjustment and response to treatment. In either case, it may be comforting to hospital administrative personnel to learn that—at least for this group—their insistance on compliance with hospital regulations may be justified by medical considerations.

Synthesis of the Three Studies

At the outset of discussion of the findings themselves, it is important to note that the results of the studies are, in general, based on correlations which are statistically significant but do not indicate a sufficiently high relationship between the variables to provide a basis for adequate individual prediction. At the same time, patterns of significant correlations can often suggest fruitful lines for further research. They can also have a value in the clinical sense, to the degree to which they suggest courses of patient management which are not being currently used but which make good psychological sense.

The patient who adjusts well to the hospital has been described as being older, more passive, and less intelligent than the patient who makes a poor adjustment. The "good patient" is apparently a person whose needs are being adequately met in the rather regimented, closely supervised atmosphere of the tuberculosis ward.

Although the sample of patients in the community adjustment study was a different one from that on which the hospital adjustment study was done, its members represent the same population of veterans with tuber-

culosis. Some direct comparison is, there-fore, permissible. Interestingly, the dis-charged patients who were adjusting better to the community shared several traits with those hospitalized patients who were making a relatively poor adjustment to the institu-tion. The younger, more independent, and intellectually brighter individual was found to be the one who was best meeting the criteria of good reintegration into the com-munity life.

A tentative relating of the contradiction presented by the difference between the person who adjusts well in the hospital and the one who adjusts well in the community may be found in the differing needs and personality traits which can make for sat-isfaction in these relatively different en-vironments. The same factors that make it possible for an individual to adequately cope with the demands of everyday life in the community may make it very difficult for him to accept the prolonged inactivity, the highly structured and dependent atmos-phere, and the goal postponement involved in the hospital treatment of tuberculosis. Conversely, certain traits such as passivity, submissiveness, and lack of clear-cut goals (while auguring badly for adequate coping with competitive middle class community living) may be well satisfied in the tuber-culosis hospital setting.

In contrast to the relatively sparse num-ber of significant relationships between the psychosocial variables and the criteria for hospital adjustment and response to treat-ment, many psychological and demographic variables were found to be related to good community adjustment. The person who makes a good community adjustment fol-lowing discharge from the hospital has been described as being younger, more intelligent, better educated, working at a white collar occupation, and showing maturity, lack of depression and anxiety, good emotional con-trol, lack of neuroticism, and a high regard for the importance of the family. These are the characteristics of the individual which society values and rewards with success. At the same time, it may be concluded that these personality characteristics are not con-

ducive to good hospital adjustment or re-sponse to treatment for tuberculosis.

Several of the factors of the 16 PF test of personality are of special interest as the three studies are compared. "Experiment-ing" individuals tend to have poor hospital adjustment but good response to treatment. "Nondistorting" is found to be related to both good response to treatment and good posthospital adjustment but tends to be negatively related to hospital adjustment. It might be hypothesized that experimenting and nondistorting represent drives toward mastery of the environment—the obverse of the passivity that is seen in the patient with good hospital adjustment.

Only one of the psychological variables—anxiety—was found to be related to all three of the criterion measures. Anxiety appears to play an important role in poor adjustment as seen both in the hospital and in the posthospital situations. Further, among those hospitalized patients with far advanced disease, the presence of anxiety was significantly related to less satisfactory response to the medical treatment of the disease process itself. These results lend some confirmation to the concept that anx-iety is a central psychological variable in determining a wide variety of behaviors.

Implications

Turning to the implications of the studies which have been reported in this mono-graph, some very important considerations concerning patient management present themselves. The finding that quite different personality traits are related to adjustment in the hospital as compared to adjustment in the community following discharge sug-gests that further attention should be paid to the kinds of need fulfillment which are found in these two situations. Great im-portance becomes attached to providing the young, intelligent, "poor hospital adjuster" with sufficient sources of gratification for those needs on which his feelings of self-worth and adequacy are based. In general, he must be helped to preserve in the hospital the family and community roles on which

the effectiveness of his posthospital adjustment will depend. On the other hand, the extended period of hospitalization can also be used to aid the passive, submissive individual, who is perhaps too contented with hospitalization, to develop personal and social attitudes and industrial skills which may better equip him to cope with posthospital life.

Quite probably the significant relationships between anxiety and the three criteria areas represent only a slightly different aspect of the above considerations. The need to maintain anxiety at a minimal state makes sense both logically and psychologically. This practical implication finds its most direct support in the indicated relationship between anxiety and the resolution of the physical disease process itself.

It is axiomatic that, as research studies progress, many new areas of investigation present themselves. This has certainly been the case in the large scale project that has been described. Redefining and refining the criteria used is certainly needed; closely associated with this is the need for the development of better measuring techniques, both for the criteria variables and for the psychological and psychosocial data.

Certain relatively specific questions demand further study, whether it be simple replication for the purpose of cross-validation or new research projects based on hypotheses generated from the current find-

ings. The hypothesized relationship between anxiety and response to treatment has led to a new project that is now under way. The design of this new study provides for the utilization of psychological tests more sensitive to the anxiety factor and also includes measures of the functioning of the autonomic nervous system and adrenal-pituitary output under the chronic stress situation which hospitalization frequently engenders. Further investigation of the environment which the hospital affords the patient is also being carried out. These projects will include the development of more refined measures of patient and staff attitudes. It is hoped that such studies will provide further insights into the factors involved in compliance and adjusting behavior in various institutional settings.

Finally, the application of the general research design which was used in these projects to the study of patients with different types of illnesses promises new insights into the relationships among diseases in which psychological variables may play important roles. The results of a series of research projects of this type would permit the kinds of cross-disease comparisons which will indicate whether the results of the projects which have been reported are characteristic of patients with tuberculosis or represent more generalized features of the psychological counterparts of chronic physical disease.

REFERENCES

AGUR, C. X., & ANDERSON, C. W. Post-hospital rehabilitation study of tuberculosis patients. *Arch. phys. Med. Rehabilit.*, 1954, **35**, 307–312.

ALLING, D., BOSWORTH, E. B., & LINCOLN, N. S. The after-history of pulmonary tuberculosis: V. Moderately advanced tuberculosis. *Amer. Rev. Tuberc.*, 1955, **71**(4), 519–528.

ANDREYCHUK, T. A comparative study of psychological factors in pulmonary tuberculosis. Unpublished doctoral dissertation, University of Texas, 1954.

ARMSTRONG, A. V. A study of the vocational rehabilitation problems of tuberculosis patients referred for counseling to educational and vocational counselors of the anti-tuberculosis league of King County between Oct. 21, 1946 and Sept. 1, 1950. Unpublished doctoral dissertation, University of Washington, 1953.

BERLE, B. B. Emotional factors and tuberculosis: A critical review of the literature. *Psychosom. Med.*, 1948, **10**, 366–373.

BROTMAN, S. An investigation of psychological factors related to rate of recovery in pulmonary tuberculosis. Unpublished doctoral dissertation, University of California, Los Angeles, 1955.

BUCK, J. N. The H-T-P technique: A qualitative and quantitative manual. *J. clin. Psychol., Monogr. Suppl.* 1948, No. 5.

CALDEN, G. A method for evaluating the attitudes of tuberculous patients. *Amer. Rev. Tuberc.*, 1953, **67**, 722–730.

CALDEN, G., THURSTON, J. R., LEWIS, W. C., & LORENZ, T. H. A psychological scale for predicting irregular discharge in tuberculous patients. *Amer. Rev. Tuberc.*, 1956, **73**, 338–350.

CATTELL, R. B. *Handbook for the Sixteen Personality Factor Questionnaire.* Champaign, Ill.: Institute for Personality and Ability Testing, 1956.

CATTELL, R. B. A universal index for psychological factors. *Psychologia*, 1957, **1**, 74–85.

CLOUSTON, T. S. Tuberculosis and insanity. *J. ment Sci.*, 1863, **2**(45), 36–65.

DERNER, G. F. Aspects of the psychology of the tuberculous. New York: Hoeber, 1953.

ELLIS, R. W., & BROWN, G. G. The nature of Rorschach responses from pulmonary tuberculosis patients. *J. clin. Psychol.*, 1950, **3**, 298–300.

GUEST, K. R. Follow-up of known tuberculosis patients. *Amer. Rev. Tuberc.*, 1943, **92**, 325–333.

HAND, T. J. Personality characteristics of tuberculosis group. *Amer. J. phys. Med.*, 1952, **31**, 95–101.

HARRIS, D. H. Psychological aspects of tuberculosis. In J. F. Garrett (Ed.), *Psychological aspects of physical disability.* (Office of Vocational Rehabilitation, Rehabilitation Service Series No. 210.) Washington, D. C.: United States Government Printing Office, 1952.

LONGTON, C. K., WAGNER, R. D., & MEIER, P. Rehabilitation of the tuberculous in Philadelphia. *Amer. Rev. Tuberc.*, 1950, **62**, 190–208.

McELROY, G. E. The relation between the amount of anxiety as depicted by projective technique and the degree of tuberculosis as diagnosed by medical authority. Unpublished master's thesis, University of New Hampshire, 1950.

MARION, A. J., & SALKIN, D. Is a vocational rehabilitation program justified in a tuberculosis hospital? *Amer. Rev. respir. Dis.*, 1959, **80**, 59–64.

MERRILL, B. R. Some psychosomatic aspects of pulmonary tuberculosis: A review of the English language literature. *J. nerv. ment. Dis.*, 1953, **117**, 9–28.

MORAN, L. J., FAIRWEATHER, G. W., MORTON, R. B., & McGAUGHRAN, L. The use of demographic characteristics in predicting response to hospitalization for tuberculosis. *J. consult. Psychol.*, 1955, **19**, 65–70.

MULDOON, J. F. Some psychological concomitants of tuberculosis and hospitalization. *Psychosom. Med.*, 1957, **19**, 307–314.

PAGE, R. B. Application of the Minnesota Multiphasic Personality Inventory to tuberculous patients. Unpublished doctoral dissertation, University of Minnesota, 1947.

PAULEEN, M. M. An investigation of the relationship between selected dimensions of personality and behavior aspects among hospitalized tuberculosis patients. Unpublished doctoral dissertation, University of Wisconsin, 1955.

Quarterly Progress Report No. 13 of the Veterans Administration–Armed Forces study on the chemotherapy of tuberculosis. Washington, D. C., 1958.

THURSTON, J. R., LORENZ, T. H., & CALDEN, G. Empirical derivation and cross-validation of surgery refusal scale for use with tuberculosis patients. Bio-Sciences Information Exchange, ZOT-C-68.

Transactions of the 18th Veterans Administration–Armed Forces conference on chemotherapy of tuberculosis. Washington, D. C., 1959.

VERNIER, CLAIRE M., WHITING, J. F., & MELSER, M. Differential accuracy of prediction of a specific behavior in three projective tests. *J. consult. Psychol.*, 1955, **19**, 175–182.

WARNER, W. L., MEEKER, M., & EELLS, K. *Social class in America.* Chicago: Science Research Associates, 1949.

WARREN, S. L. A comparative analysis of the post-discharge experiences of TB patients. *Amer. Rev. Tuberc.*, 1954, **69**(2), 153–163.

Appendix

Composite Projective Test Factors

The semistructured, 20-item, Madison Sentence Completion Test, and the person drawing from the House-Tree-Person Test were used to obtain the projective test data in these studies. These provided three sources of scorable data.

Language Characteristics

The writing used to complete the Sentence Completion Test was studied for important variables and 21 were selected such as: type of writing (i.e., print, script, or both); sentences omitted; percentage of personal pronouns, etc.

Sentence Content

An appropriate and meaningful classification of the content of the answers to the sentence completion items was developed through the study of the frequency distribution of those items. Sentence 4 with its scoring scheme may be considered typical of these.

4. When the odds are against you.

a. Vigorous positive action (fight harder)

b. Action negatively stated (don't give up)

c. Half hearted action (do the best you can, try to do something)

d. Passive acceptance (be patient, forget it)

e. Religion (pray, have faith)

f. Philosophical statement (could be worse, worry does not help, a test of our resources)

g. Negative emotion (worry, frustrated, downhearted)

h. Hopeless situation (no escape, nothing you can do)

Person Drawing Characteristics

Objectively observable aspects of the person drawing were scored as present or absent. This included some 35 items such as hands omitted, hair on the head, body shading present, an unseeing eye (empty circle), etc.

The test protocols for 500 hospitalized subjects were used in devising the scoring variables. After this was done, each test was then scored for all these 76 variables. For each answer a meaningful cutting point was selected to divide the distribution in two fairly equal parts. Then, using tetrachoric correlation, each was compared with all the others. The resulting 76 by 76 correlation matrix was the source of the groupings of items that make up the composite projectives. Groupings of items which significantly relate to each other were selected by inspection, and named according to the apparent psychological meaning suggested by their content. Table A1 shows the items which contribute to each of the composite scores and their intercorrelation within each factor.

TABLE A1

Item Groupings and Their Intercorrelations on Projective Test Variables

Item Groupings	Intercorrelations (r_i)			
1. Family Importance		#14	#20	
SC#12. I worry most about—family		.41	.39	
SC#14. My family responsibilities—many, most important			.36	
SC#20. I feel happiest when—visitors, at home				
2. Evasion	Nonpersonal pronouns	#10	#2	#19
SC. Less than 13% nouns	.33	.29	—*	—
SC. Over 7% nonpersonal pronouns		.32	—	—
SC#10. One can use liquor—when needed, anytime			.31	.33
SC#2. When first told of my TB—denial, no feeling				.26
SC#19. I have most confidence—not the doctor				
3. Passivity				#7
SC#1. Lying in bed makes me—happy, relaxed, rested well				.41
SC#7. Having TB wouldn't be so bad if—not more activity, had specific things				
4. Anxiety			Broken pressure	Variable retracing
Person drawing: Broken lines			.50	.24
Variable line pressure				.69
Retracing				
5. Moral Judgment			#9	#11
SC#3. I like a doctor who—frank, honest			.31	.29
SC#9. The sort of person I like is—basic character				.52
SC#11. The sort of person I don't like is—basic character defect				
6. Control	Vertical	Vertical midline	Arms down	
Person drawing: Belt present		.41	.41	
Vertical midline			.55	
Arms straight down				
7. Independent Security			Added details	Ground line
SC#17. When people push me around—not "don't like"			.49	.47
Person drawing: Additional details				.49
Ground line				

Note. — SC indicates sentence completion.
* Value was not computed.